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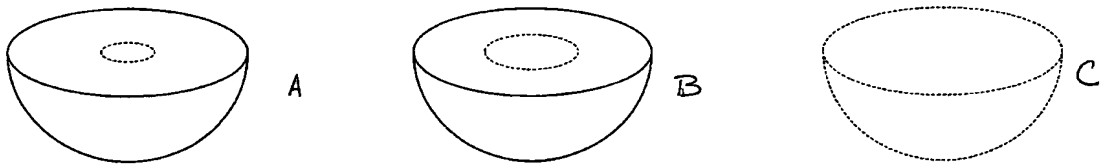
(54) Title: FLUORESCENT SILICA-BASED NANOPARTICLES



(57) Abstract: The invention generally relates to fluorescent nanoparticles and more specifically to silica-based fluorescent nanoparticles of less than 30nm with covalently attached organic dyes. The invention provides a fluorescent monodisperse silica nanoparticle comprising fluorophore center core and a silica shell wherein the radiative properties of the nanoparticle are dependent upon the chemistry (composition) of the core and presence of the silica shell. In one aspect of the invention, the core-shell architecture provides an enhancement in fluorescence quantum efficiency. The invention generally provides control of photophysical properties of dye molecules encapsulated within silica particles with sizes down to 30 nm and below. This control is accomplished through changes in silica chemistry and particle architecture on the nanometer size scale and results in significant brightness enhancement compared to free dye.

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